

ENDF/B-VII.1 status beta3 release

Assembling, Verification, Further steps

M. Herman
National Nuclear Data Center
Brookhaven National Laboratory

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U.S. DEPARTMENT OF
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Science

ENDF/B-VII.1b3 release

- Release May 26, 2011 (neutron sublibrary)
- 418 materials (the same as in beta2)
- GForge revision 319 (71 commits since beta2)
- 28 materials modified
- 186 materials with covariance data (111 in beta2, COMMARA-2.0 covariances migrated)
- ACE files available to GForge registered users
- NJOY covariance plots by MacFarlane
- NJOY energy-balance plots by MacFarlane
- POINT2011 by Red Cullen

ENDF/B-VII

US Library of Evaluated Nuclear Reaction Data

[ENDF/B-VII.1beta... Releases](#)

[ENDF/B-VII.1beta3 Covariance Plots](#)

[ENDF/B-VII.1beta3 Energy-Balance Plots](#)

[POINT2011beta3](#)

[Neutron evaluations \(ex ENDF/A\)](#) | [Full library](#) | [CSEWG actions](#) | [Issues](#) | [Discussion list](#) | [Documents](#)

Recent News

ENDF/B-VII.1beta3 Released

GForge Admin User

2011-05-26

ENDF/B-VII.1beta3 has been released for testing. The complete tarball is available at 'Files' menu item. The individual files could be accessed under SVN menu item 'tags' folder.

Subversion (SVN) repository has been reopened for submissions of new/revised evaluations.

Time	Activity Type	By
2011-Jun-14		
16:32:53	<u>Tracker item "Energy balance" opened</u>	<u>Mike Herman</u>

Release Name ↕	Release Date ↕	Filename ↕
<u>beta3</u>	2011-05-24 00:00:00-04	ENDF-B-VII.1beta3-release-notes.pdf
		ENDF-B-VII.1beta3-covar_mt.txt
		ENDF-B-VII.1beta3.tgz
<u>beta2</u>	2011-02-22 00:00:00-05	beta2 vs VII0-Cullen.pdf
		POINT2011.pdf
		ENDF-B-VII.1beta2-covar_mt.txt
		ENDF-B-VII.1beta2.tgz
		ENDF-B-VII.1beta2-covar.txt
		ENDF-B-VII.1beta2-release-notes.pdf
<u>beta1</u>	2011-01-11 00:00:00-05	ENDF-B-VII.1beta1.tgz
		beta1-versus-VII_0.txt
		ENDF-B-VII.1beta1-fizcon-errors
		beta1-versus-beta0.txt
		ENDF-B-VII.1beta1-checkr-errors
<u>beta0</u>	2010-10-22 00:00:00-04	ENDF-B-VII.1beta0-new-rev-list.txt
		ENDF-B-VII.1beta0-checkr-errors
		ENDF-B-VII.1beta0-fizcon-errors
		ENDF-B-VII.1beta0.tgz

Changes in beta3

- **He-3** New capture G.M.Hale x-sec, adjusted total & kept elastic.
- **Be-9** Capture x-sec updated, total & non-elastic (MT1,3) adjusted accordingly
- **C-nat** Replaced capture x-sec with JENDL-4.0 < 20 MeV. Total & non-elastic (MT1,3) adjusted accord.
- **O-16** Reverted to ENDF/B-VII.0 (including original capture x-sec)
- **Na-23** Reverted to ENDF/B-VII.0. Work in progress.
- **Cl-35** 16 proton widths $133 < E < 954$ keV increased to 400 meV
- **Co-58** New BNL evaluation (Said & Hl. Kim).
- **Ni-62** Fix total widths for res. parameters (Said)

Changes in beta3 (cont.)

- **Mo-92** Updated thermal, resonance, unresolved resonance regions (Said)
- **Mo-95** Fix total widths for res params (Said)
- **Tc-99** Thermal and resonance region modified (Said)
- **Sn-115** Fix total widths for res. parameters
- **Xe-124** Fix total widths for res. parameters
- **Cs-133** Unresolved res. region updated (Said).
- **Nd-145** New eval. of unresolved res. region (Said).
- **Eu-153** Thermal capture updated including Widder data (Said).
- **Ta-181** New fast neutron region by LLNL. AWR in MF2, minor deficiencies. Trkov, BNL, various fixes, resonance background MF3 fixed.

Changes in beta3 (cont.)

- **W-180,2,4,6** Correct max num of Legendre coeff. for MF4/MT2 (Mattoon)
- **U-233** Corrections to x-sec & ang. dist.
- **U-236** Range in MF5/MT455 corrected
- **U-237** MF5/MT455 range correction from 20 to 30 MeV
- **U-239** Restore missing (n,f) from 20-30 MeV.
- **Pu-238** Modified fission cross section ~5 MeV, and added multi-chance fission components. Added missing 30 MeV points.
- **Am-242m1** LANL fixed multiplicities in MT 16,17, and 37
- **Am-243** Set obsolete MATP to zero in MF8. Trkov, BNL

Covariances in ENDF/B-VII.1- β 3

- Total materials with covariance data : 186
- (see talk by S. Hoblit)

Covariance	# materials
MF31	72
MF32	54
MF33	180
MF34	67
MF35	62

COMMARA covariance data migrated to ENDF/B-VII.1 β 3

- Transfer of MF33 data with no (or minor) modifications to files without pre-existing covariances:

H-1,2, Li-6, Be-9, B-10,11, C-0, N-15, Mg-24,25,26, Al-27, Si-28,29,30, Ni-60, Mo-92,94,95,96,97,98,100, Zr-90,91,92,93,94,95,96, Nb-95,

Ru-101,102,103,104,106, Ag-109, Cs-133,135, Pr-141, Nd-143,145,146,148, Pb-204,206,207,208, Bi-209

COMMARA covariance data migrated to ENDF/B-VII.1 β 3

- Transfer of MF33 data with reduced optical peaks in fast region, no pre-existing covariance data:
Pd-105,106,107,108, I-127,129, La-139, Ce-141, Pm-147, Sm-149,151,152, Xe-131,132,134, Eu-153,155, Er-166,167,168,170
- Merge of AFCI MF33 data with existing MF32 data:
Cr-50,52,53, Ni-58
- Merge of AFCI MF33 data where differences between VII.0 and VII.1 may be larger than report uncertainties:
Fe-54,56,57

COMMARA covariance data migrated to ENDF/B-VII.1 β 3


- AFCI actinide MF33 data adopted into files with no prior covariances:
Am-241m,243 (minor fixes), **Np-237**, **U-236** (with minor LANL-approved fix)
- New LANL fission (MF33/MT18) evaluation supplemented with AFCI covariances:
Pu-241

Beta3 on Web:

<http://www.nndc.bnl.gov/sigma/>

NNDC National Nuclear Data Center

NNDC Databases: NuDat | NSR | XUNDL | ENSDF | MIRD | ENDF | CSISRS | Sigma


Sigma Evaluated Nuclear Data File (ENDF) Retrieval & Plotting 

New in 3.2: JENDL-4.0 library, improved mathematical operations.

Periodic Table Browse | Directory Tree Browse | Basic Retrieval | Advanced Retrieval | Plot Cart | Computations

Select first a library, then a sublibrary and finally click on a chemical element to obtain results.
Data are available for materials with a cyan background.


Library: Sublibrary:



1	H																	2	He																
3	Li	4	Be																	5	B	6	C	7	N	8	O	9	F	10	Ne				
11	Na	12	Mg																	13	Al	14	Si	15	P	16	S	17	Cl	18	Ar				
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
37	Rb	38	Sr	39	Y	40	Zr	41	Nb	42	Mo	43	Tc	44	Ru	45	Rh	46	Pd	47	Ag	48	Cd	49	In	50	Sn	51	Sb	52	Te	53	I	54	Xe
55	Cs	56	Ba	57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu		
87	Fr	88	Ra	89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Es	100	Fm	101	Md	102	No	103	Lr		

Beta3 on Web:


<http://www.nndc.bnl.gov/x4/endlf00.jsp>

 **National Nuclear Data Center**


NNDC Databases: NuDat | NSR | XUNDL | ENSDF | MIRDB | ENDF | CSISRS | Sigma

Search the NNDC:


Evaluated Nuclear Data File (ENDF)



ENDF ENDF/B-VII.0 released December 15, 2006
Core nuclear reaction database containing evaluated (recommended) cross sections, spectra, angular distributions, fission product yields, thermal neutron scattering, photo-atomic and other data, with emphasis on neutron-induced reactions. All data are stored in the internationally adopted format (ENDF-6) maintained by CSEWG.



CSEWG 2006
Sigma - 3.0
ENDF retrieval and plotting system
February 2009

Basic Retrieval | Extended Retrieval | Advanced Retrieval | Help |  Retrieval

Target ☐
56fe; fe-56; 26-fe-56; fe*

Reaction ☐
n,*; n,tot; n,g; n,f; n,inf; n,nu*

Quantity ☐
sig; da; de; da/de; res; cov*

Library
☐ All ☒ Selected ☐ Reset

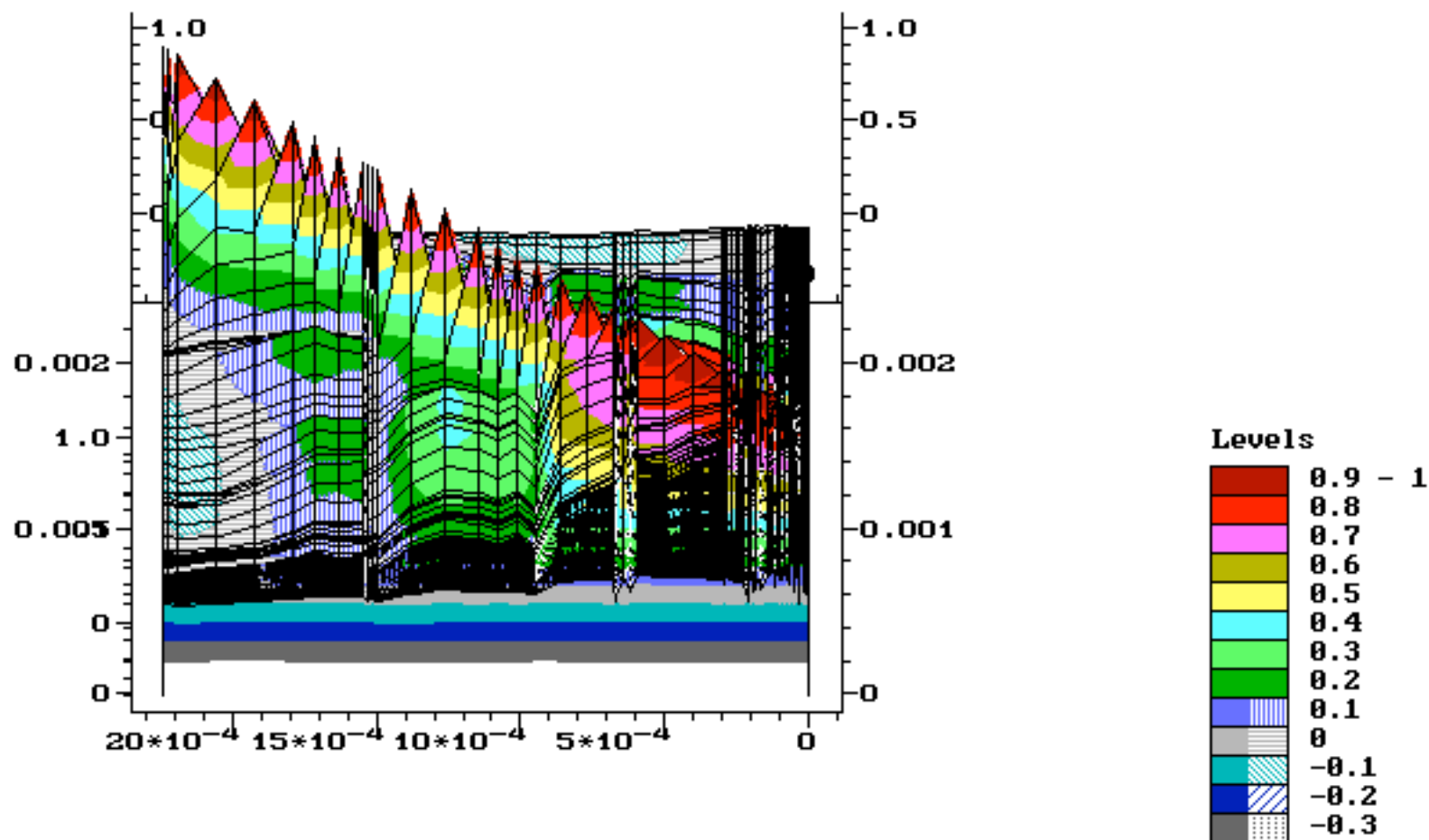
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<input checked="" type="checkbox"/>	ENDF/B-VII.1b3	(USA, 2011)
<input checked="" type="checkbox"/>	JEFF-3.1	(Europe, 2005)
<input checked="" type="checkbox"/>	JENDL-4.0	(Japan, 2010)
<input checked="" type="checkbox"/>	JENDL-3.3	(Japan, 2002)
<input checked="" type="checkbox"/>	CENDL-3.1	(China, 2009)
<input checked="" type="checkbox"/>	ROSFOND	(Russia, 2010)
<input checked="" type="checkbox"/>	ROSFOND	(Russia, 2008)
<input checked="" type="checkbox"/>	ENDF/B-VI.8	(USA, 2001)

NNDC Site Index
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ENDF-6 Formats Tutorial
ENDF-6 Formats for SAMMY Users
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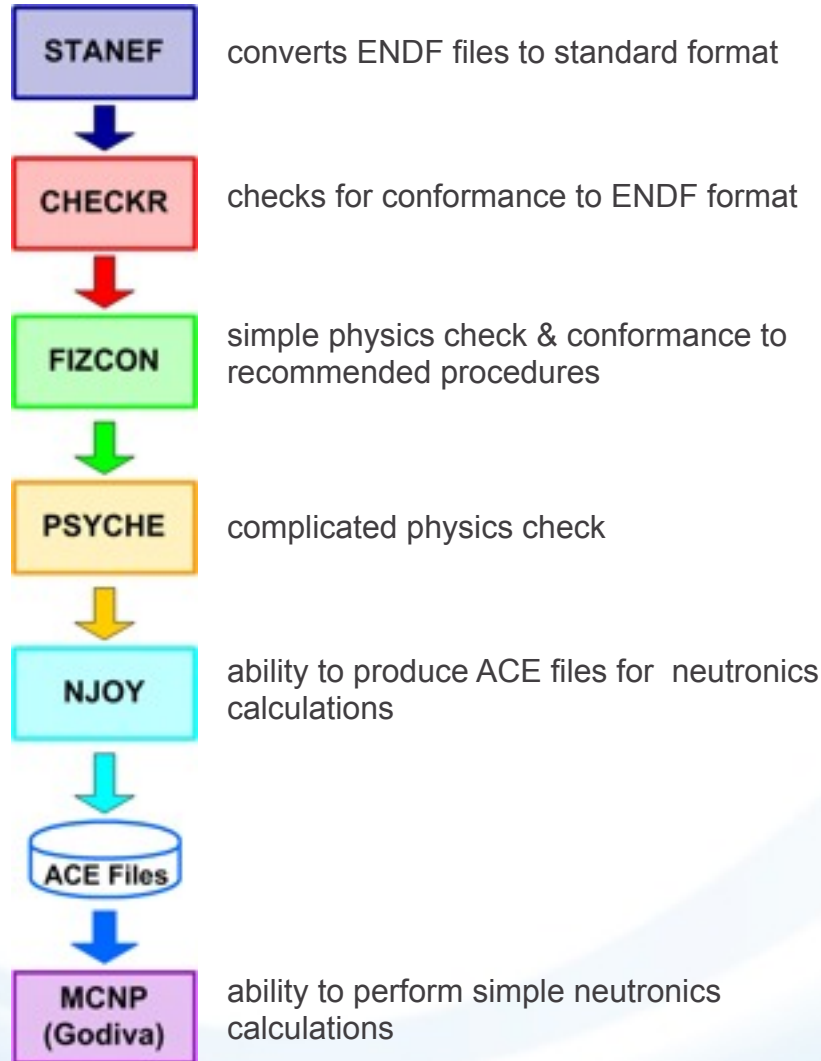
$^{235}\text{U}(\text{n},\text{elastic})$ covariance matrix

ENDF Request 19810, 2011-Jun-19, 01:03:05

ENDF/B-VII.1: U-235(N,EL)U-235-L0



Data Verification Process Flow



Platform: NNDC Linux Cluster



ENDF Utility Codes Results

■ CHECKR Errors

- **8 materials** affected: Be-7, Mn-55, W-180, W-182, W-183, W-184, W-186, Th-232
- More details available at:
<https://ndclx4.bnl.gov/gf/project/endl/frs/ENDF-B-VII.1beta3-release-notes.pdf>

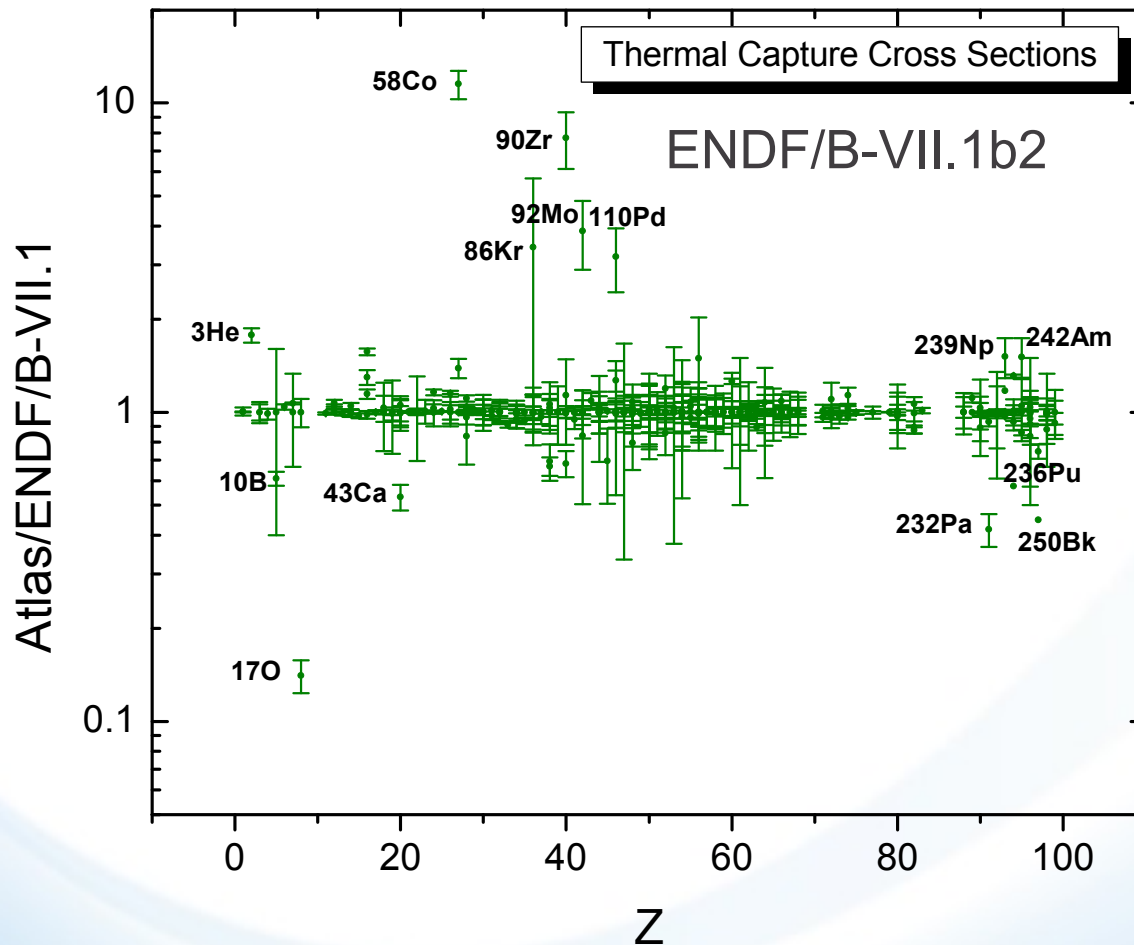
■ FIZCON Errors

- **68 materials** affected: H-1, Li-6, O-16, Mg-26, Si-28, Ar-40, Ti-49, V-50, Cr-52, Fe-54,56, Ni-58, Zn-65,67,68, 70, Ge-70,76, As-74, Kr-85, Rb-86, Sr-84, Zr-94, Nb-93, Rh-103, Sn-120, Te-132, Xe-131, Ba-133, Ce-136,138, 143, Nd-147, Sm-147,150, Eu-153,157, Tb-160, Dy-156,158,161,162,164, Hf-174,176,177,178,179,180, W-180,182,183,184,186, Ir-191,193, Hg-198,200,201, Bi-209, Th-232, Pa-231, U-234, Np-237, Pu-240, Cm-243,248,249

NJOY and MCNP5 Results

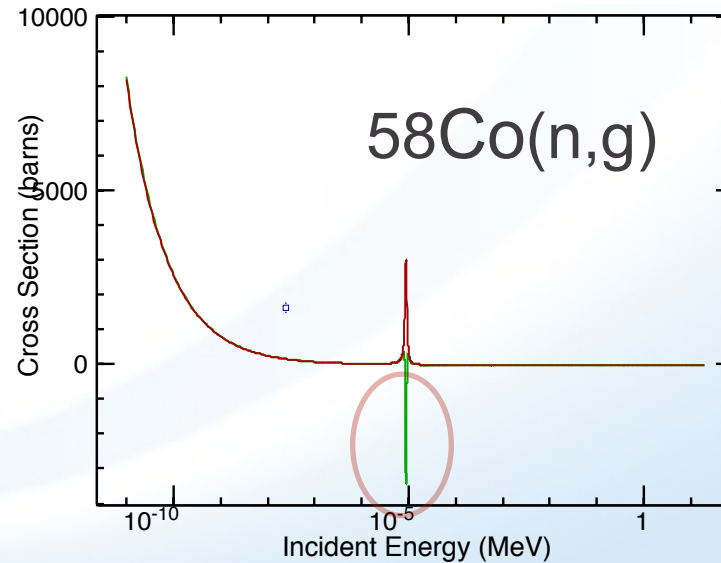
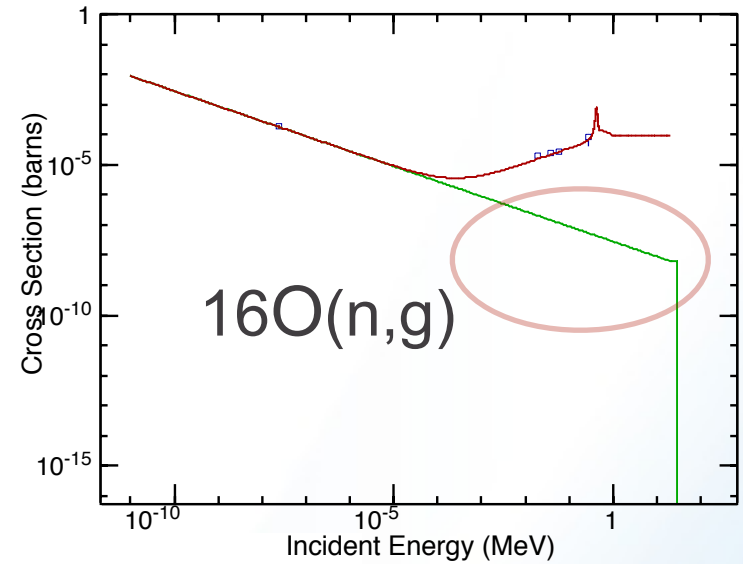
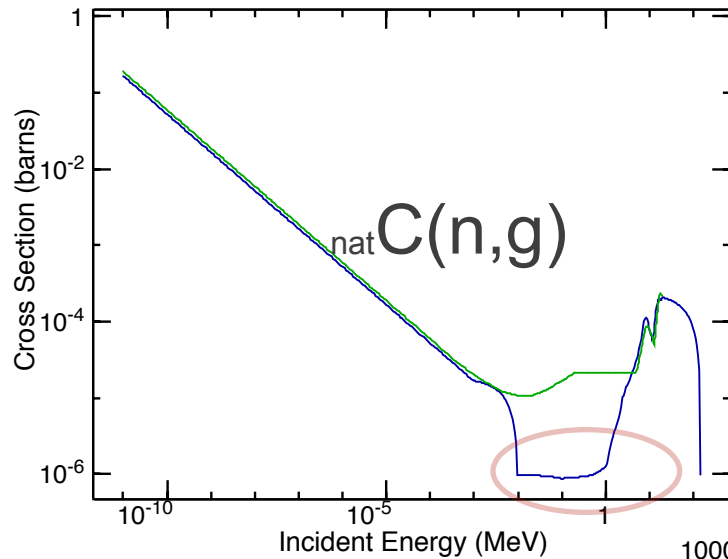
- All **418 materials** successfully processed
- NJOY/ACER flagged problems in energy distribution of alpha production in **44 materials**: C-nat, N-14, O-16, F-19, Al-27, Si-28,29,30, P-31, Ca-40,43,46, 48, Ti-49, Cr-50,52,53,54, Fe-54,56,57, Ni-58,60,61,62,64, Cu-63,65, Nb-93, Mo-96,97, Eu-153, Ta-180, Hg-198,199,200,201, 202,204, Pb-204,206,207,208, Bi-209
- More details at:
<https://ndclx4.bnl.gov/gf/project/endl/frs/ENDF-B-VII.1beta3-release-notes.pdf>

Thermal capture comparison by Boris Pritychenko



- low- and medium-Z:
 - poor experimental data (comparison of theoretical calculations)
 - He-3, Said adopted Wolfs data; VII.1 is in between Wolfs and Alfimenkov
 - Co-58 deficiency in VII.1
 - Zr-90 evaluation update
- high-Z region: new evaluations from the Actinoid file

Corrections resulting from comparison



Plans for beta4

- Beta4 release ~September 2011
 - Review and corrections to covariances in beta3
 - Updating descriptive sections (MT=451)
 - beta4 = ENDF/B-VII.1 except clerical fixes
- Substantive changes in beta4:
 - New decay data by BNL
 - New beta-delayed gammas by LANL
 - New FPY files by LANL
 - New 16-O R-matrix eval. by G.Hale if discrepancies resolved
 - New TI and Tm evaluations by LANL
 - New Zr if BNL files validate successfully
 - 23-Na if new BNL file performs not worse than VII.0
 - V to improve integral performance
 - 243-Am(n,2n) total cross section (isomeric ratio is OK)
 - 143-Nd thermal & resonance region (Mughabghab)
 - We'll consider changes motivated by Kadonis comparison

Plans for ENDF/B-VII.1 release

- Approval by CSEWG in week of November 14-18, 2011
- ENDF/B-VII.1 release December 2011
- NDS set of publications December 2011